National Weather Service River Forecast System

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NWSRFS Defined

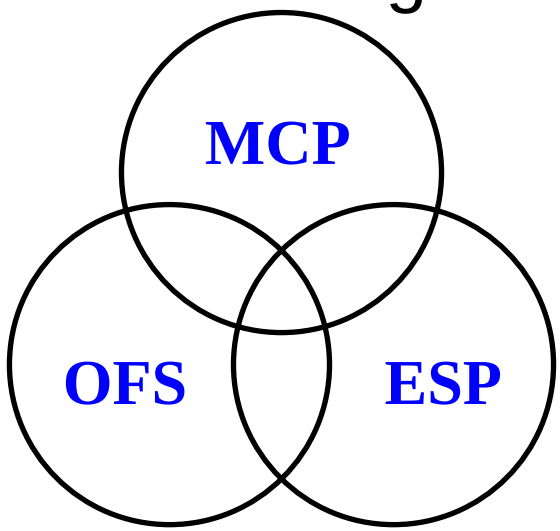
“ A comprehensive set of integrated hydrologic techniques used by National Weather Service River Forecast Centers to perform their hydrologic forecast functions.”

NWSRFS Described

- Offers a variety of modular hydrologic models and computational operations.
- Main Components are:
  - process-based or conceptual
  - continuous
  - lumped in space and time

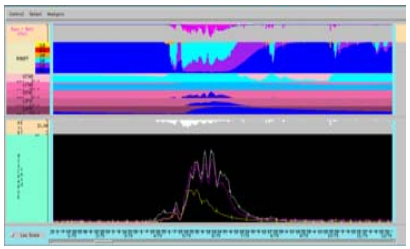
NWSRFS Described

- Operates in 3 integrated modes.
  - Calibration <== parameter estimation
  - Operational <== short term forecasts
  - Ensemble <== longer term forecasts



National Weather Service River Forecast System

Three Interconnected Components
Forecasts For Hours To Seasons

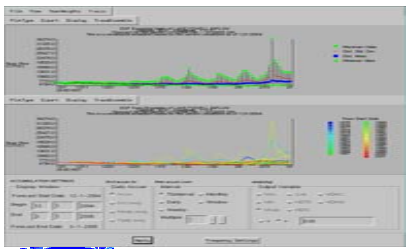


1 Calibration System

Interactive Calibration Program

2 Operational Forecast System

Interactive Forecast Program



3 Ensemble Streamflow Prediction System

ESP Analysis/Display Program

Time and Space

- Time steps
  - Can be 1, 3, 6, 12, or 24 hour.
- Basin areas from 75 km2 - 5000+ km2.
- Mountainous watersheds typically subdivided into two or more elevation zones.

A Collection of Models and Processes

Simulate Snow – Accumulation and Ablation

Compute Runoff Using Soil Moisture Models

Distribute Runoff In Basin

Route From Basin and Through Channel

Reservoir Operations

Data Management

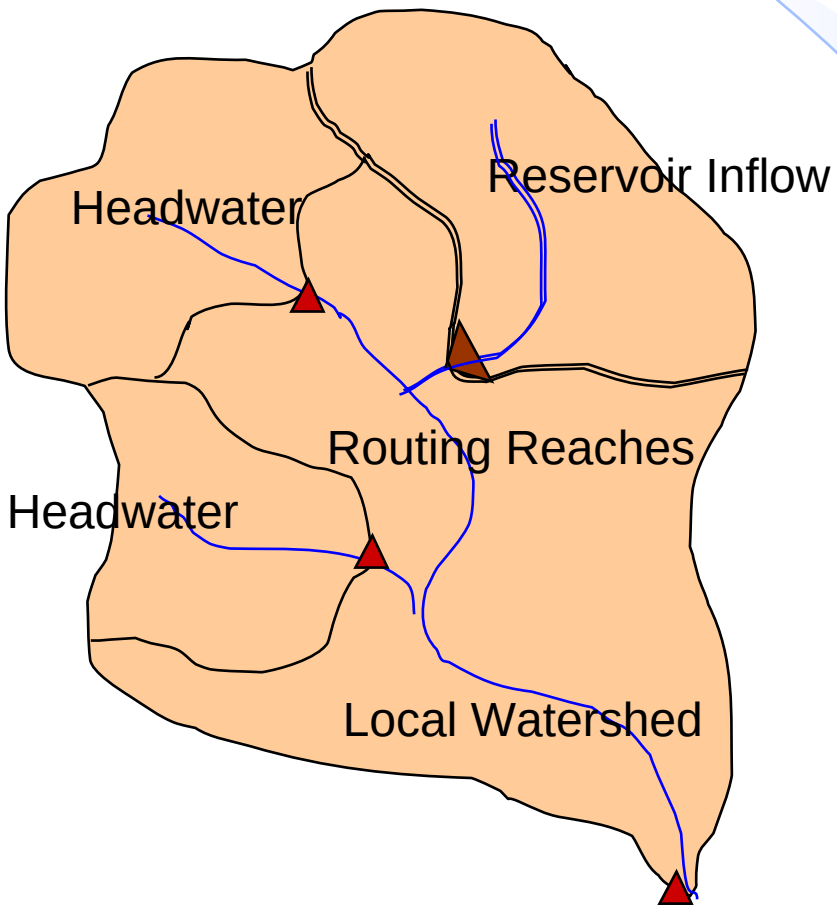
Other Operations

- Routing (hydrologic/hydraulic).
- Artificial regulation.
  - Reservoirs, diversions, consumptive use.
- Stage - discharge conversion.
- Observed - simulated/forecast blending.

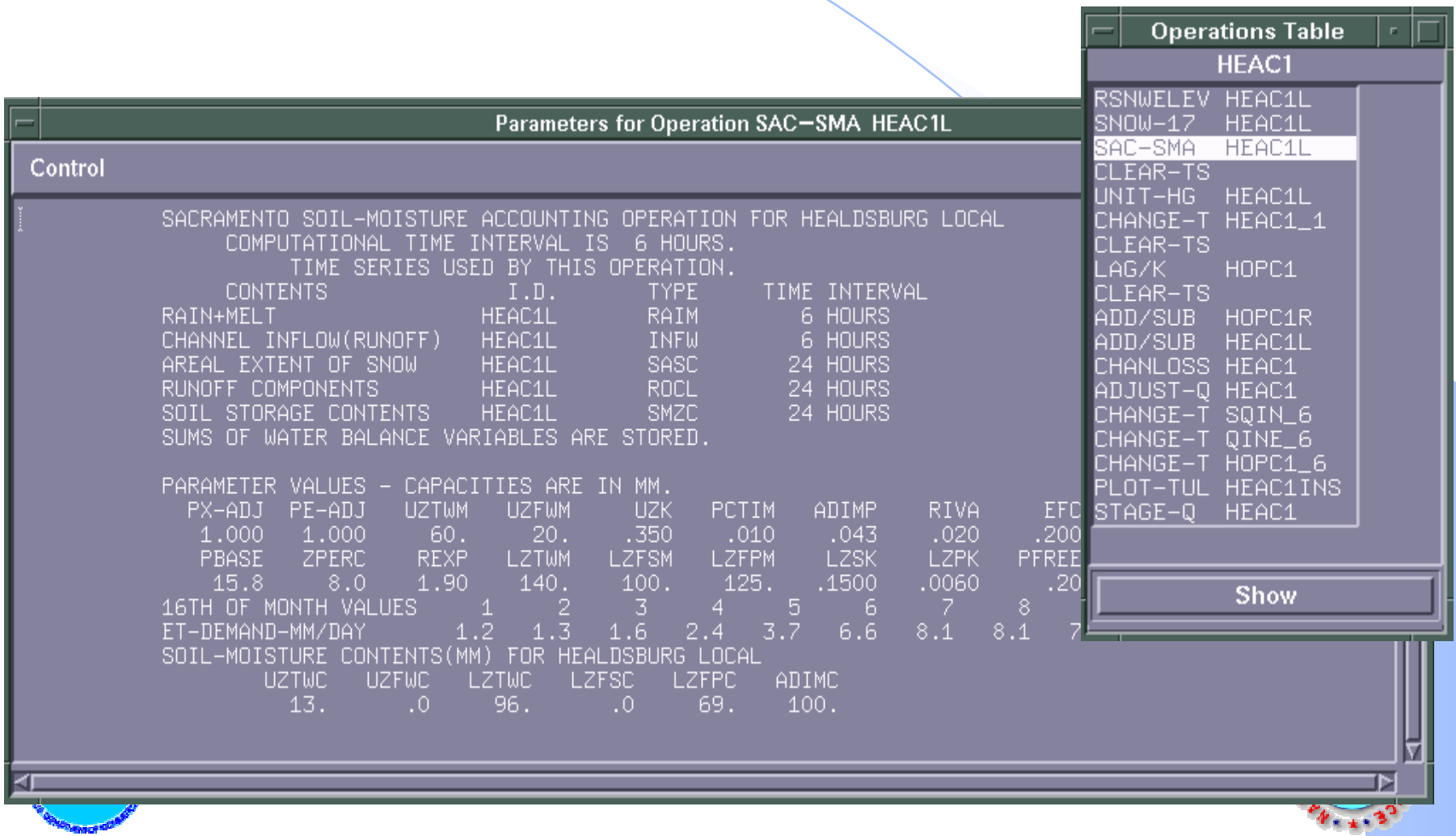
Other Operations

- Arithmetic.
  - Add/subtract, average, time-shift
- Analysis and display.
  - Statistical sampling
  - Summarization
  - Graphical display

Typical River System Configuration

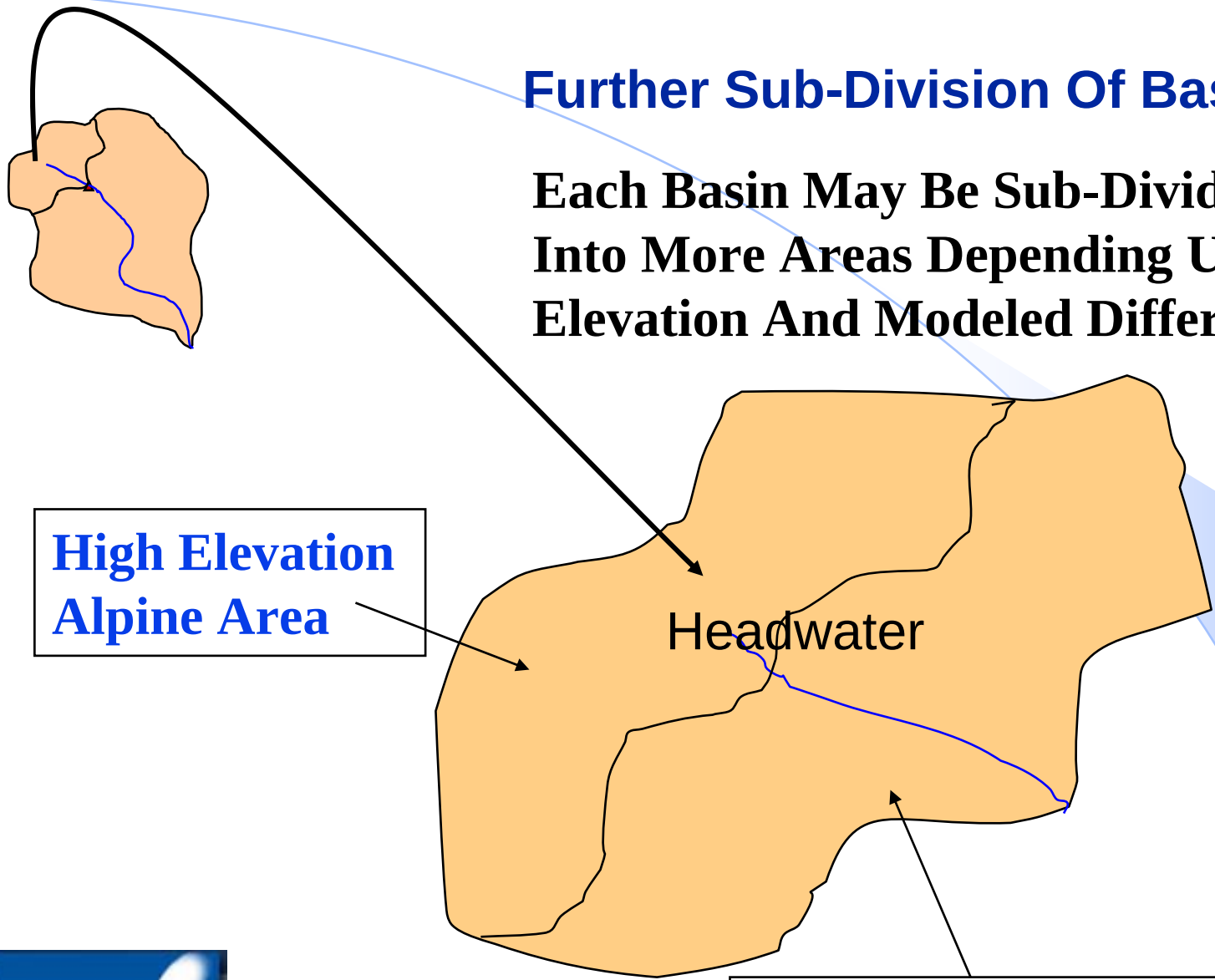


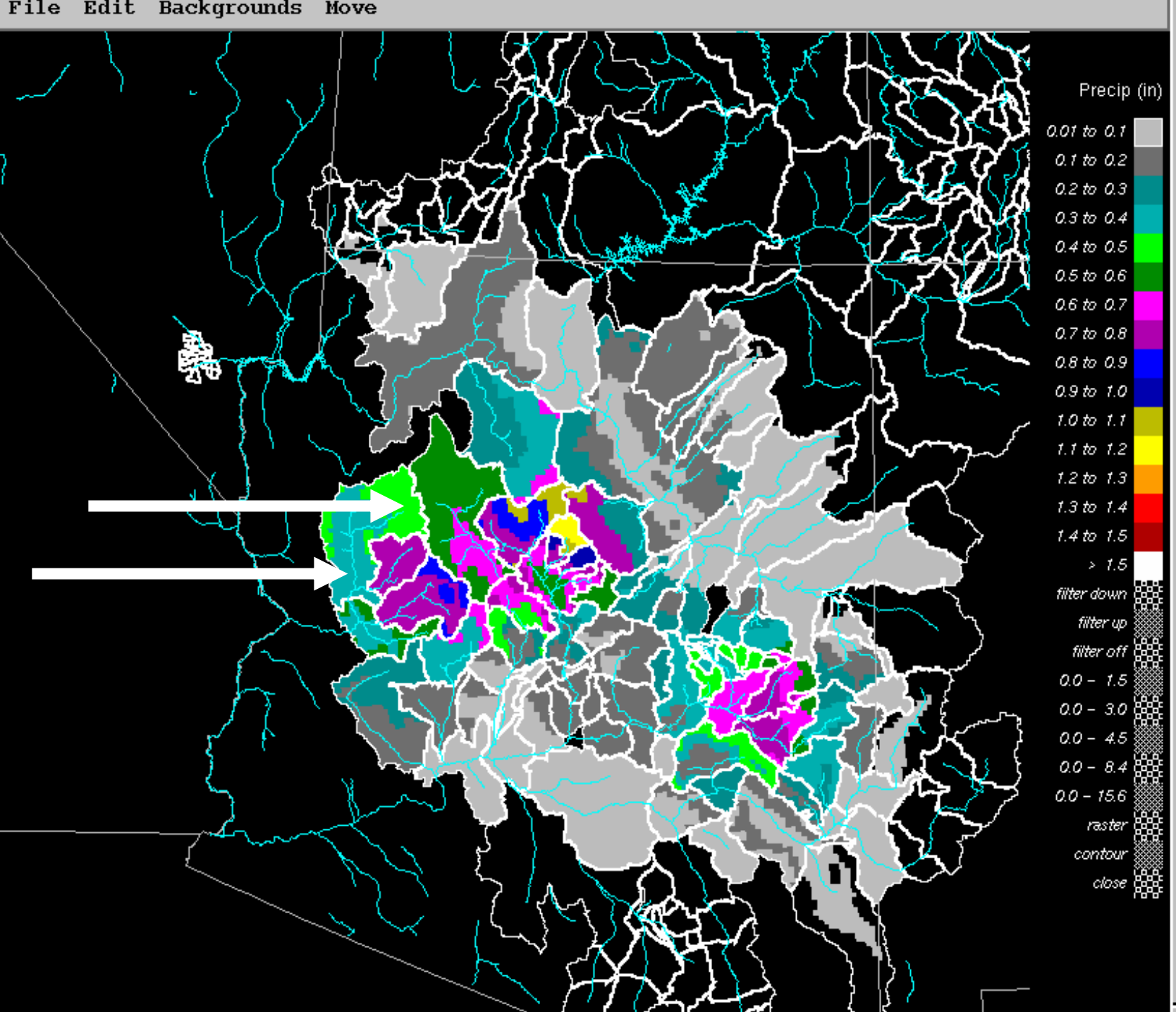
Processing
IFP Operations Table Display



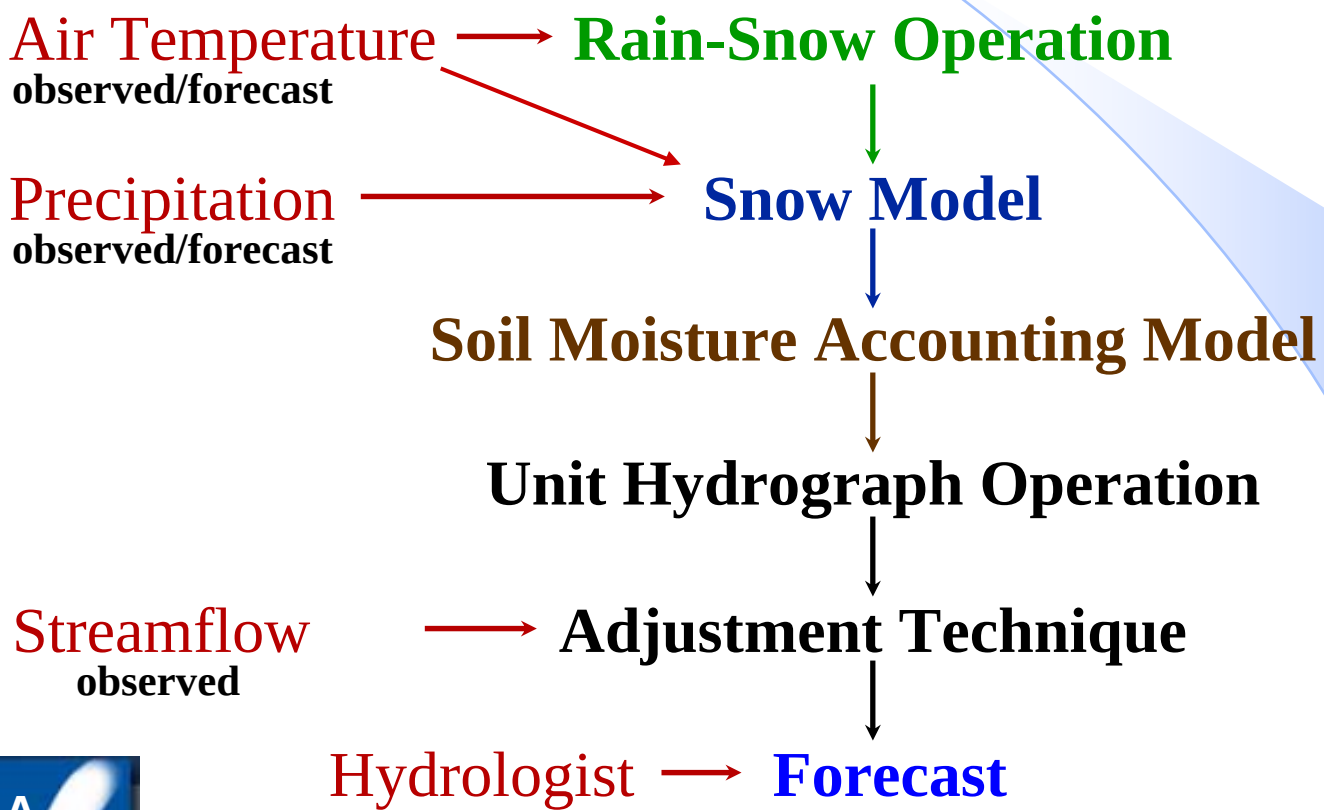
Further Sub-Division Of Basin

Each Basin May Be Sub-Divided Into More Areas Depending Upon Elevation And Modeled Differently




File Edit Backgrounds Move
Precip (in)
0.01 to 0.1
0.1 to 0.2
0.2 to 0.3
0.3 to 0.4
0.4 to 0.5
0.5 to 0.6
0.6 to 0.7
0.7 to 0.8
0.8 to 0.9
0.9 to 1.0
1.0 to 1.1
1.1 to 1.2
1.2 to 1.3
1.3 to 1.4
1.4 to 1.5
> 1.5
filter down
filter up
filter off
0.0 - 1.5
0.0 - 3.0
0.0 - 4.5
0.0 - 8.4
0.0 - 15.6
raster
contour
close

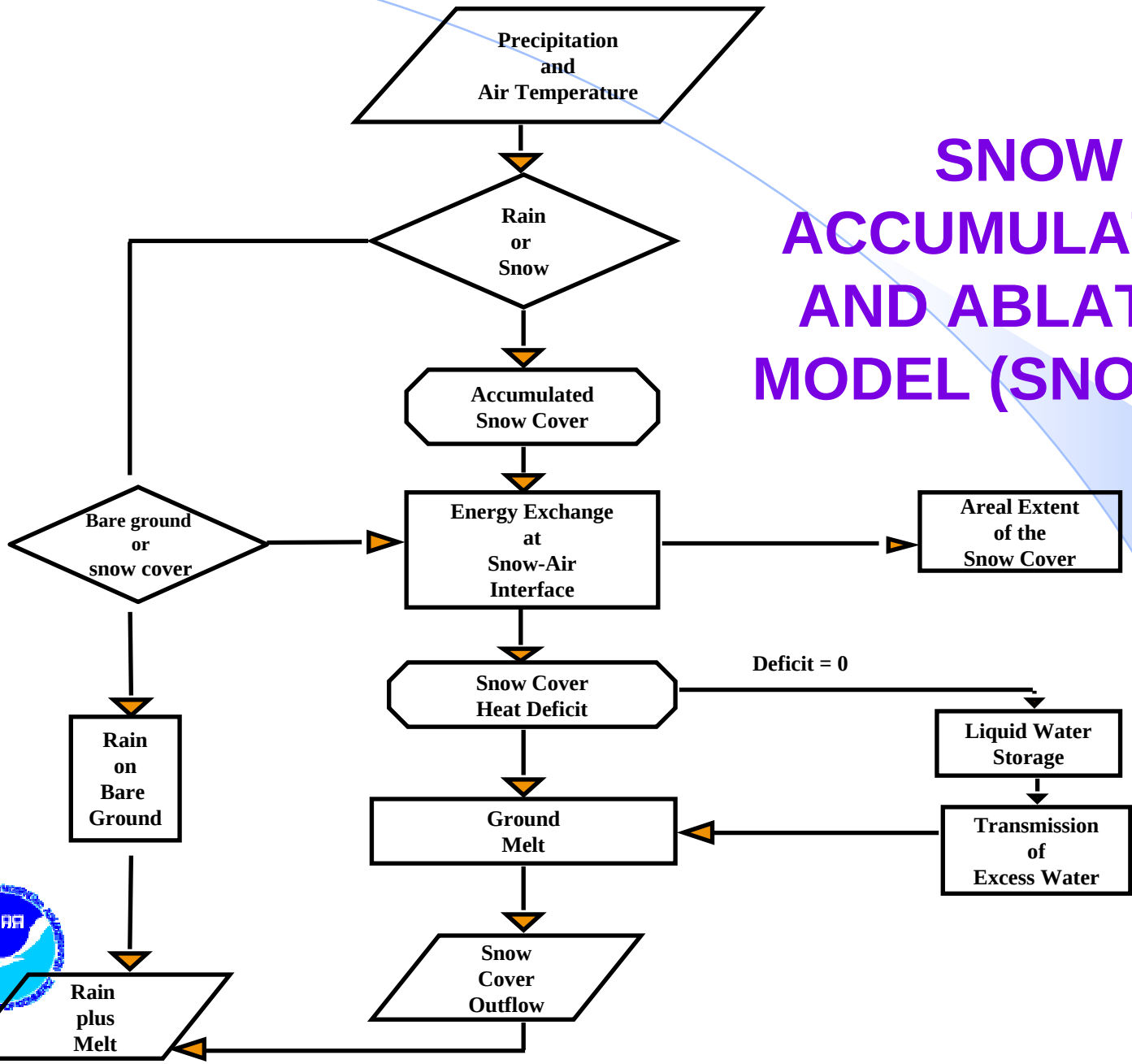
Typical Watershed Configuration For Each Area in the Basin



Two of the Most Widely Used Models by Most RFCs

- SNOW-17 Model
  - Simple Inputs – Precipitation/Temperature
  - Requires Calibration
- Sacramento Soil Moisture Accounting Model (SACSMA)
  - Conceptual Model
  - Requires Calibration

SNOW ACCUMULATION AND ABLATION MODEL (SNOW-17)



Sacramento Soil Moisture Accounting Model